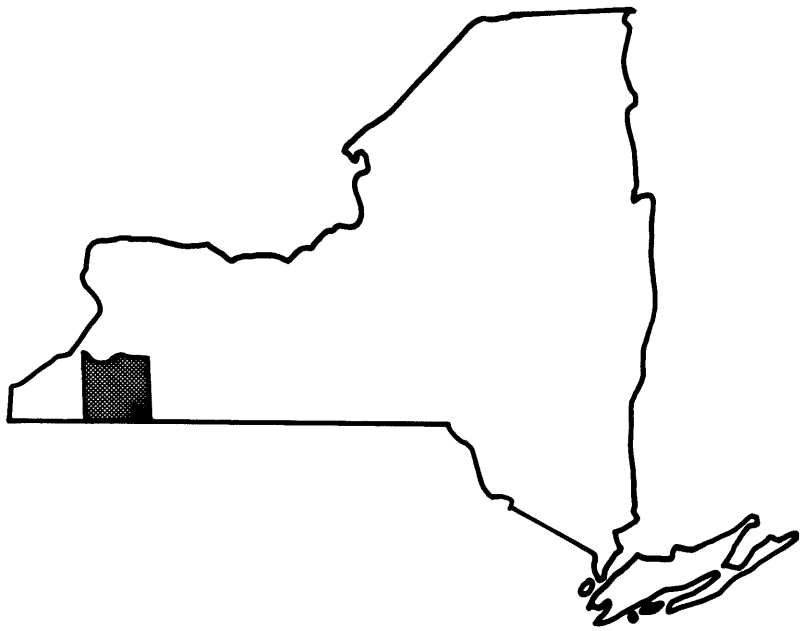
FLOOD INSURANCE STUDY

TOWN OF ALLEGANY, NEW YORK

CATTARAUGUS COUNTY



MAY 1978

U.S. DEPARTMENT of HOUSING & URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1
	1.1 Purpose of Study	1
	1.2 Coordination	1
	1.3 Authority and Acknowledgements	1
2.0	AREA STUDIED	2
	2.1 Scope of Study	2
	2.2 Community Description	2
	2.3 Principal Flood Problems	4
	2.4 Flood Protection Measures	5
3.0	ENGINEERING METHODS	5
	3.1 Hydrologic Analyses	7
	3.2 Hydraulic Analyses	8
4.0	FLOOD PLAIN MANAGEMENT APPLICATIONS	10
	4.1 Flood Boundaries	10
	4.2 Floodways	11
5.0	INSURANCE APPLICATION	12
	5.1 Reach Determinations	12
	5.2 Flood Hazard Factors	15
	5.3 Flood Insurance Zones	16

TABLE OF CONTENTS - continued

	Page
5.4 Flood Insurance Rate Map Description	16
6.0 OTHER STUDIES	18
7.0 LOCATION OF DATA	18
8.0 BIBLIOGRAPHY AND REFERENCES	18

FIGURES

Figure 1 - Vicinity Map	3
Figure 2 - Allegheny River, June 1972 Flood, Town of Allegany	6
Figure 3 - Allegheny River, June 1972 Flood, at St. Bonaventure University	6
Figure 4 - Floodway Schematic	15

TABLES

Table 1 - Maximum Floods of Record	6
Table 2 - Summary of Discharges	8
Table 3 - Floodway Data	13-14
Table 4 - Flood Insurance Zone Data	17

EXHIBITS

Exhibit 1 - Flood Profiles	
Allegheny River	Panels 01P-02P
Fivemile Creek	Panels 03P-05P
Fourmile Creek	Panel 06P

West Branch Fourmile Creek	Panel 07P
Twomile Creek	Panel 08P

Exhibit 2 - Flood Boundary and Floodway Map Index

Exhibit 3 - Flood Boundary and Floodway Map — Panels 360061 0001B to 0015B

PUBLISHED SEPARATELY:

Flood Insurance Rate Map Index

Flood Insurance Rate Map — Panels 360061 0001B to 0015B

FLOOD INSURANCE STUDY
TOWN OF ALLEGANY, NEW YORK

1.0 INTRODUCTION

1.1 Purpose of Study

The purpose of this Flood Insurance Study is to investigate the existence and severity of flood hazards in the Town of Allegany, Cattaraugus County, New York, and to aid in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. Initial use of this information will be to convert the Town of Allegany to the regular program of flood insurance by the Federal Insurance Administration (FIA). Further use of this information will be made by local and regional planners in their efforts to promote sound land use and flood plain development.

1.2 Coordination

On July 29, 1975, a meeting was held among representatives of the Town of Allegany, the FIA, the U. S. Army Corps of Engineers (COE), the U. S. Department of Agriculture, Soil Conservation Service (SCS), the Cattaraugus County Planning Board, and the New York State Department of Environmental Conservation (DEC) to explain the purpose of the Flood Insurance Study.

A search for basic data was made at all levels of government. Hydrologic and hydraulic data for streams in the study area were provided by the COE, Pittsburgh District, and the SCS. A questionaire was sent to town officials requesting information of past flooding problems and background information.

The final Consultation and Coordination meeting was held on February 16, 1977, where the final draft of the Flood Insurance Study was presented for final local comment. The meeting was attended by representatives of the Town of Allegany, the Village of Allegany, the Cattaraugus County Planning Board, the FIA, the DEC and interested property owners. The study was acceptable to the community.

1.3 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968, as amended.

The hydrologic and hydraulic analyses for this study were performed by the New York State Department of Environmental Conservation for the Federal Insurance Administration, under Contract No. H-3856. This work, which was completed in October 1976, covered all significant flooding sources in the Town of Allegany. Cross sections used in the hydraulic analyses of all streams, with the exception of the Allegheny River, were obtained under subcontract to the U. S. Department of Agriculture, Soil Conservation Service. Approximate flood boundaries were determined in July 1974, by Gannett, Fleming, Corddry, and Carpenter, Inc., Harrisburg, Pennsylvania.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the area of the Town of Allegany. Not included in this study is the Village of Allegany. The area of study is shown on the Vicinity Map (Figure 1).

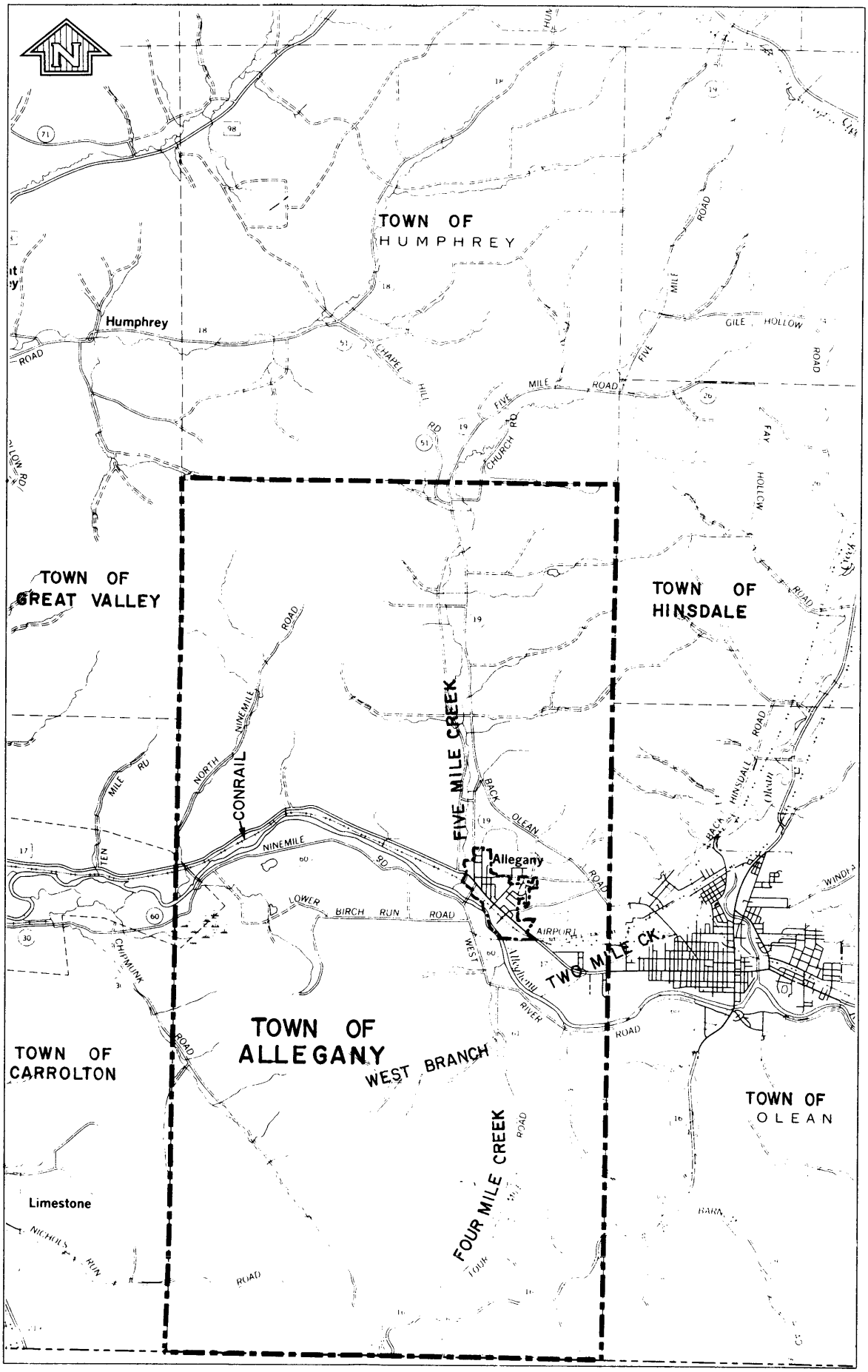
There are five major streams within the study area: Allegheny River, Fourmile Creek, West Branch of Fourmile Creek, Twomile Creek, and Fivemile Creek. Because of development in the flood plain areas, it was agreed among representatives of the town, the study contractor, and the FIA, that these five streams should be studied in detail.

Streams studied by approximate methods include portions of Fourmile Creek, West Branch Fourmile Creek, Chipmunk Creek, Birch Run and several other unnamed streams in the community; these streams were studied by approximate methods due to the lack of planned development in these areas.

The areas studied in detail were chosen with consideration given to all forecasted development and proposed construction for the next five years (through January 1982).

2.2 Community Description

The Town of Allegany is located in the southern portion of Cattaraugus County in western New York State. It is bordered on the east by the City of Olean and the Towns of Olean and Hinsdale, on the west by the Towns of Great Valley and Carrolton, on the north by the Town of Humphrey and on the south by the State of Pennsylvania. The town lies within the Allegheny Plateau, an area of rolling uplands cut by numerous, steep-walled valleys. Elevations within the town range up to 2,300 feet in the hills north and south of the Allegheny River. Where the Allegheny River crosses the western town boundary the valley elevation is about 1,400 feet. The Allegheny River collects the drainage from the town as it flows westward.


TOWN OF HUMPHREY
Humphrey
TOWN OF GREAT VALLEY
TOWN OF HINSDALE
TOWN OF ALLEGANY
TOWN OF CARROLTON
TOWN OF OLEAN
Limestone
Allegany
AIRPORT
CONRAIL
FIVE MILE CREEK
TWO MILE CK.
FOUR MILE CREEK
WEST BRANCH
NINEMILE
LOWER BIRCH RUN ROAD
CHAPEL HILL RD
CHURCH RD
FIVE MILE ROAD
GILE HOLLOW ROAD
FAY HOLLOW ROAD
BACK OLEAN ROAD
BACK HINSDALE ROAD
WINDY
NORTH NINEMILE ROAD
MILE RD
CHIPMUNK ROAD
NICHOLS RUN ROAD
WEST BRANCH RIVER ROAD
BARN
APPROXIMATE SCALE
2 0 2 4 6 miles
VICINITY MAP
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration
TOWN OF ALLEGANY, NY
(CATTARAUGUS CO.)
FIGURE 1

Fourmile Creek and its west branch rise in the southern portion of the Town of Allegany and flow northerly into the Allegheny River. Twomile Creek rises in the western part of the Town of Olean and flows in a westerly direction into the Town of Allegany to a junction with the Allegheny River. Fivemile Creek begins in the Town of Ischua about 10 miles north of the Village of Allegany. It flows south through the Towns of Humphrey and Allegany in a wide flat valley to join with the Allegheny River at the village's western boundary with the Town of Allegany. The Allegheny River rises in Pennsylvania, flows in a large loop through southwestern New York State, and returns to Pennsylvania where it joins the Monongahela River at Pittsburgh to form the Ohio River.

The Town of Allegany has an area of approximately 72 square miles. Land use in the uplands is primarily woodland with some agriculture and oil fields. On the broad valleys along Allegheny River and the creeks are located nearly all the residential and urban developments. Agriculture is also an important land use in the valleys. All major roads follow the natural transportation corridors provided by the valleys.

Physiographically, the area is composed of maturely dissected plateaus designated as the Northwestern Appalachian Plateau Border and the Allegheny Plateau. The soils range from gravelly loam to clay but in most places the soil is silty loam. The forests are composed principally of Yellow Birch, Beech, and Hard Maple.

The wood lots are, for the most part, kept free of underbush by grazing animals (Reference 1).

The town population was 6,843 in 1960 and had increased to 7,542 by 1970 (Reference 2).

The climate of the town is typical of western New York with warm summers and winters with moderate to heavy snowfall. Average January and July temperatures are 23^{o}F and 70^{o}F, respectively. Precipitation is approximately 45 inches per year of which 22 inches becomes runoff (Reference 3).

2.3 Principal Flood Problems

The most frequent floods in the study area result from heavy winter or early spring rainfall, usually augmented by melting snow. The estimated flow for the flood of September 29, 1967, was 29,400 cubic feet per second (cfs) for the Allegheny River at the South First Street Bridge, with a flood stage of 1,412 feet. This

is the fourth highest flood in recent years. The COE made a field investigation on this flood.

The largest recorded flood on the Allegheny River at Olean, New York, was 59,000 cfs in June 1972, estimated as having a recurrence interval of approximately 200 years (Reference 4). Photographs of the July 1972 flooding of the Allegheny River in the Town of Allegany are shown in Figures 2 and 3. Other major floods in the town are presented in Table 1, "Maximum Floods of Record" (Reference 5).

TABLE 1 - MAXIMUM FLOODS OF RECORD

Date	Order of Magnitude	Elevation (Stage (NGVD)	Flow (cfs)	Approximate Frequency (Estimated) in Years
July 19, 1942	2	1,415.2	44,000	65
March 9, 1956	3	1,412.5	31,000	18
May 29, 1946	4	1,412.4	30,000	17
September 29, 1967	5	1,412.2	29,400	16

No historical flood data is available for the other flooding sources studied in detail in the community.

2.4 Flood Protection Measures

A small portion of the town, southeast of the Village of Allegany, is protected from flooding by the Allegheny River by an extended section of the Olean flood control dike. The dike protects this area of the town from the 100-year flood on the Allegheny River. This structure was completed by the COE in 1952 and is maintained by the State of New York.

The COE has proposed construction of a few thousand feet of earth dike along the east bank of Fivemile Creek. On January 1976, this proposal was placed on an inactive civil projects list. Its potential effects were not considered in this study.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Floods having recurrence intervals of 10, 50, 100, and 500 years have been selected as having special significance for flood plain management and for flood insurance premium rates. The analyses reported here reflect current conditions in the drainage areas of the streams.

Figure 2 - Allegheny River in Town of Allegany, looking east (1972 Agnes Flood).

Figure 3 - Allegheny River at St. Bonaventure University, looking west (1972 Agnes Flood).

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for floods of the selected recurrence intervals for each stream studied in detail in the community.

On the Allegheny River, the peak discharge-frequency relationship was based primarily on a statistical analysis of the stage and discharge records of the gaging station near the City of Olean (Reference 6). This gaging station, at the Water Treatment Plant of the City of Olean, was established in 1942 and is maintained by the city. The rating curve for this gage was developed by the U. S. Geological Survey (USGS) and is used by the National Weather Service for flood forecasting (Reference 7). The statistical procedures used in this analysis are those proposed by Leo R. Beard, which utilize a log-Pearson Type III distribution as a base method for flood flow-frequency studies (Reference 8). This methodology conforms with the uniform techniques for determining flood flow frequencies as set forth by the hydrology committee of the United States Water Resources Council (Reference 9).

To develop peak discharge frequency relationships for Fivemile Creek, Fourmile Creek, West Branch Fourmile Creek, and Twomile Creek, a synthetic rainfall-runoff relationship method, based on a dimensionless unit hydrograph, was used to develop flood flow-frequency relationships (Reference 10). The 24-hour rainfall amounts for frequencies up to 100 years, as obtained from the Rainfall Frequency Atlas of the United States, were plotted on log-normal paper and the rainfall amount for the 500-year frequency was extrapolated from the resulting graph (Reference 11).

The watershed of each stream was divided into subareas to evaluate the hydrologic effects of as many tributaries as would be significant.

The Computer Program TR-20, developed by the SCS, was used to compute surface runoff (Reference 12). This program takes into account conditions affecting runoff such as land use, type of soil, shape, and slope of watershed and antecedent moisture condition. It developes a hydrograph and routes the hydrograph through stream channels and reservoirs. The program is designed to combine the routed hydrograph with those from other tributaries and print out the total composite hydrograph peak discharges, and times of occurrence at each desired point in the watershed for each storm evaluated. Discharge-drainage area relationships are presented in Table 2, "Summary of Discharges."

TABLE 2 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. Miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
ALLEGHENY RIVER					
At Upstream Town Boundary	1,169	26,300	41,000	49,000	72,000
FIVEMILE CREEK					
At Section H	37.1	1,746	2,712	3,047	3,976
At Section AO	16.4	1,028	1,596	1,793	2,339
FOURMILE CREEK					
At Section A	12.7	1,018	1,565	1,820	2,431
At Section R	6.7	643	989	1,150	1,535
WEST BRANCH FOURMILE CREEK					
At Section N	3.8	414	637	740	989
TWOMILE CREEK					
At Upstream Town Boundary	3.5	180	300	360	510

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the streams studied in detail in the community were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each of these streams.

Flood profiles on the Allegheny River were calculated using the COE HEC-2 water-surface profiles computer program (Reference 13).

Distance references used in the computer backwater analysis of the Allegheny River were based on the COE mile marker system. As a result, there are discrepancies in lengths appearing in the computer output and the correct distances that appear on the mapping and the profiles in this respect. This level of accuracy is consistent with the general method of calculations used in the backwater determinations and the low energy differential occurring along the reaches under analysis.

Flood profiles on Fivemile Creek, Fourmile Creek, and Twomile Creek were calculated using the SCS WSP-2 water surface profiles computer program (Reference 14). This program uses the standard step method, with some modifications, to compute profiles between valley sections. All profiles are computed in the upstream direction.

Therefore, only subcritical flow, a condition normally characteristic of natural streams, can be analyzed. For any super-critical flows encountered, the program will assume critical depth and resume computations. At any one road restriction, WSP-2 can compute head losses through one bridge opening or up to five culvert openings with different configurations.

Cross sections were obtained by field survey and were located at close intervals above and below bridges, at control sections along the stream length, and at significant changes in ground relief, land use, or land cover. Bridges and culverts were field surveyed to obtain elevation data and structural geometry in order to compute the significant backwater effects of these structures. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway is computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 3).

Reach lengths for the channel were measured along the centerline of channel between sections and overbank reach lengths were measured along the approximate centerline of the effective out-of-channel flow area.

For the Allegheny River, roughness coefficients (Manning's "n") were assigned on the basis of on-site field inspections and ground level photographs. These photographs were compared with U. S. Geological Survey (USGS) calibrated photographs (Reference 15), taking into consideration channel conditions, overbank vegetation and land use. Roughness values vary from 0.025 to 0.060 for the main channel and 0.060 to 0.100 for the overbank areas.

For Fivemile Creek, Fourmile Creek, West Branch Fourmile Creek, and Twomile Creek, Manning's "n" values were determined by field inspection and based on the National Engineering Handbook, Section 5, (Supplement B) (Reference 10). In arriving at a realistic value, due weight was given to the natural materials the channel was composed of, surface irregularity, variations in shape and size of cross sections, characteristics of obstructions such as debris deposits, stumps, exposed roots, boulders, fallen and lodged logs, type of vegetation, and degree of meandering. Roughness values range from 0.045 to 0.060 for the main channel and from 0.065 to 0.095 for overbank areas of these streams.

For starting profile computations, the tailwater elevations on the Allegheny River, as supplied by the COE were used (Reference 16).

Starting elevations for other streams in the study area were taken from water-surface elevations for the Allegheny River.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals. All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD), formerly referred to as Sea Level Datum of 1929; elevation reference marks used in the study are shown on the maps.

The hydraulic analyses for this study are based only on the effects of unobstructed flow. The flood elevations as shown on the profiles are thus considered valid only if hydraulic structures in general remain unobstructed and do not fail.

For Birch Run, studied by approximate methods, USGS Flood Height Drainage Area Curves for the 100-year flood were utilized (Reference 17). Drainage areas were developed at selected locations from USGS 7.5 Minute series topographic maps (Reference 18). 100-year flood heights were then extracted from the curves and the 100-year flood boundaries were plotted on New York State Department of Transportation planimetric maps (Reference 19). Estimates of discharges and slopes and a field view of each stream were also employed to verify the delineation. Other approximate 100-year flood boundaries were taken from the FIA Special Flood Hazard Boundary Maps (Reference 20).

It should be noted that no flood height-drainage area relation has been developed by the USGS for the Allegheny River Basin. However, the upper Genesee River Basin, immediately to the east of the Allegheny River Basin, has definite hydrologic and hydraulic similarities to the area of study and was, therefore, used in the analysis.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

A prime purpose of the National Flood Insurance Program is to encourage state and local governments to adopt sound flood plain management programs. Each Flood Insurance Study, therefore, includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FIA as the base

flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community.

For each stream studied in detail, the boundaries of the 100-year and the 500-year floods have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using topographic maps developed for this study from aerial photographs at a scale of 1"=400' with a contour interval of five feet (Reference 21). In cases where the 100-year and the 500-year flood boundaries are close together, only the 100-year boundary has been shown.

For the streams studied by approximate methods, the boundaries of the 100-year flood were developed as described above (Section 3.2). Other approximate 100-year flood boundaries were taken from the FIA Special Flood Hazard Boundary Map (Reference 20).

The boundaries of the 100-year and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 3). Small areas within the flood boundaries may lie above the flood elevations and therefore, not be subject to flooding; owing to limitations of the map scale, such areas are not shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights. Minimum standards of the FIA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this report are presented to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

The floodways presented in this study were computed on the basis of equal conveyance reduction from each side of the flood plain. The floodways presented for Fivemile Creek, Fourmile Creek, West Branch Fourmile Creek, and Twomile Creek, were computed using the SCS HUD-15 Computer Program (Reference 22). Where special topographic features required it, the floodway was adjusted more toward one side of the stream as necessary. The results of these computations are tabulated at selected cross sections for each stream segment for which a floodway is computed (Table 3).

As shown on the Flood Boundary and Floodway Map (Exhibit 3), floodway widths were determined at cross sections; between cross sections, boundaries were interpolated. In cases where the boundaries of the floodway and the 100-year flood are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 4.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for each flooding source affecting the Town of Allegany.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Fourmile Creek							
A	1,965[1]	248	1,341	1.28	1,419.7	1,418.7	1.0
B	3,420[1]	88	387	4.40	1,426.8	1,425.8	1.0
C	5,040[1]	50	251	6.66	1,433.7	1,432.7	1.0
D	5,800[1]	74	385	4.28	1,440.4	1,439.4	1.0
E	6,410[1]	104	315	3.75	1,444.6	1,443.6	1.0
F	7,500[1]	34	172	6.77	1,454.0	1,453.0	1.0
G	10,230[1]	38	171	6.62	1,477.6	1,476.6	1.0
West Branch Fourmile Creek							
A	495[2]	64	249	3.08	1,443.5	1,442.5	1.0
B	1,130[2]	35	121	6.30	1,455.0	1,454.0	1.0
C	2,475[2]	28	114	6.61	1,474.2	1,473.2	1.0
Twomile Creek							
A	2,800[1]	35	128	3.20	1,408.1	1,407.1	1.0
B	3,070[1]	102	303	1.35	1,408.4	1,407.4	1.0
C	3,630[1]	27	128	3.13	1,409.6	1,408.6	1.0
D	4,655[1]	42	430	0.88	1,414.1	1,413.1	1.0
E	5,330[1]	49	635	0.57	1,414.2	1,413.2	1.0

[1]FEET ABOVE CONFLUENCE WITH ALLEGHENY RIVER
[2]FEET ABOVE CONFLUENCE WITH FOURMILE CREEK

TABLE 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF ALLEGANY , NY

(CATTARAUGUS CO.)

FLOODWAY DATA

FOURMILE CREEK, WEST BRANCH FOURMILE CREEK AND TWOMILE CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Allegheny River							
A	5,359[1]	1,950	15,000	3.27	1,408.2	1,407.5	0.7
B	11,431[1]	930	11,100	4.41	1,409.8	1,409.0	0.8
C	20,566[1]	2,080	18,300	2.67	1,415.0	1,414.1	0.9
D	27,482[1]	995	15,360	3.19	1,417.7	1,416.7	1.0
E	37,726[1]	2,790	24,100	2.03	1,422.2	1,421.3	0.9
Fivemile Creek							
A	2,485[2]	426	3,070	0.99	1,417.6	1,416.6	1.0
B	3,375[2]	202	1,229	2.40	1,418.0	1,417.0	1.0
C	5,470[2]	125	683	4.25	1,423.1	1,422.1	1.0
D	7,340[2]	45	413	7.01	1,431.8	1,430.8	1.0
E	9,525[2]	86	631	4.60	1,441.1	1,440.1	1.0
F	12,450[2]	175	695	4.03	1,453.8	1,452.8	1.0
G	18,890[2]	167	695	3.56	1,479.7	1,478.7	1.0
H	22,456[2]	79	351	6.55	1,497.5	1,496.5	1.0
I	23,430[2]	133	675	3.26	1,502.2	1,501.2	1.0
J	25,356[2]	95	540	4.07	1,509.6	1,508.6	1.0
K	29,916[2]	133	697	2.94	1,519.5	1,518.5	1.0
L	34,908[2]	188	895	2.07	1,529.5	1,528.5	1.0

[1]FEET ABOVE CORPORATE LIMITS
[2]FEET ABOVE CONFLUENCE WITH ALLEGHENY RIVER

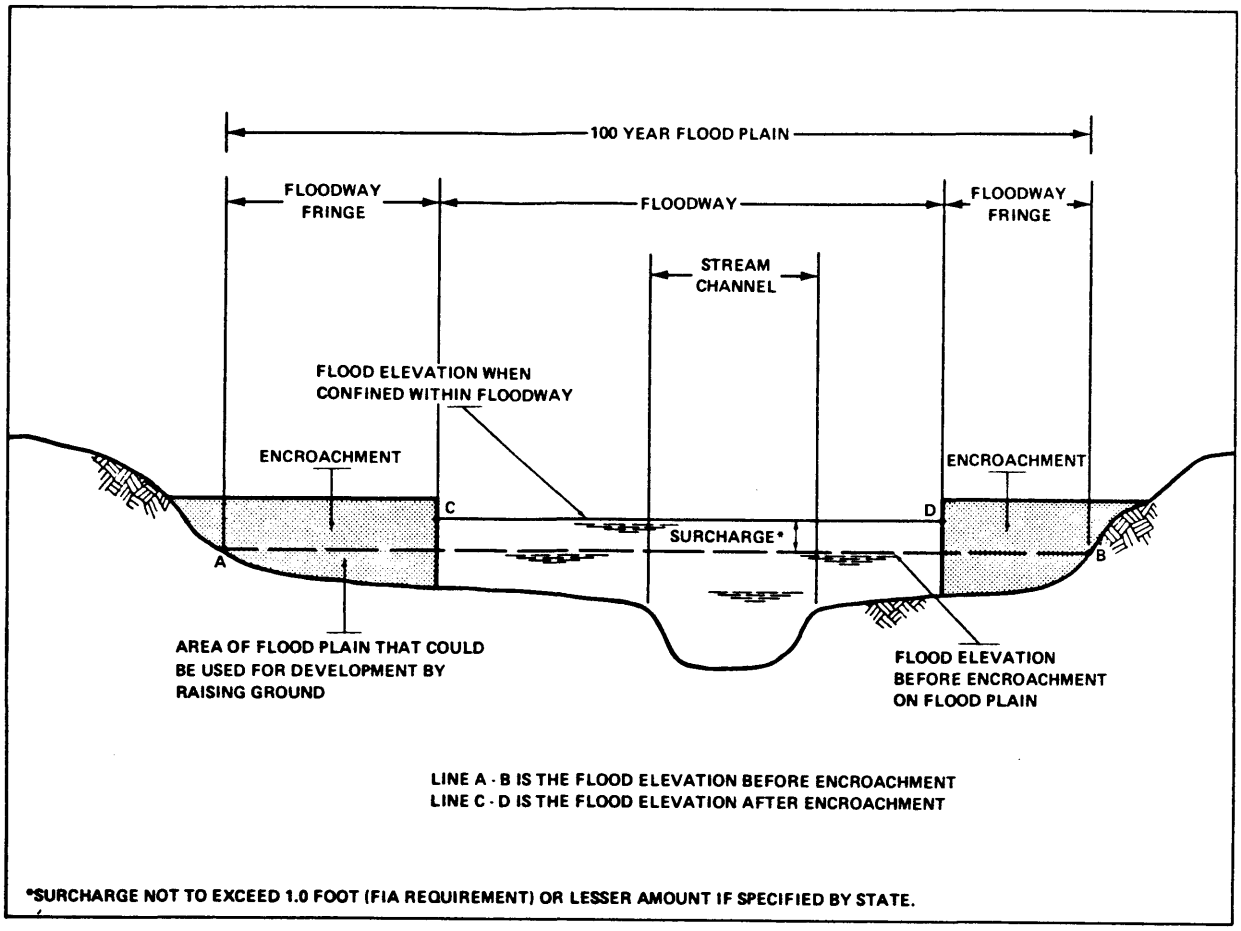
TABLE 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF ALLEGANY, NY
(CATTARAUGUS CO.)

FLOODWAY DATA

ALLEGHENY RIVER AND FIVEMILE CREEK



FLOODWAY SCHEMATIC Figure 4

Eight reaches meeting the previous criteria were required for the flooding sources of the Town of Allegany. These included one on the Allegheny River, four on Fivemile Creek, and one each on Twomile Creek, Fourmile Creek, and West Branch Fourmile Creek. The locations of the reaches are shown on the Flood Profiles (Exhibit 1).

5.2 Flood Hazard Factors

The FHF is the FIA device used to correlate flood information with insurance rate tables. Correlations between property damages from floods and their FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average difference between the 10-year and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10-year

and 100-year floods is 0.7 foot; the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10-year and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire area of the Town of Allegany was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone A:	Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations shown or FHFs determined.
Zones A1, A2, A3, A4, A8, and A9:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHFs.
Zone B:	Areas between the Special Flood Hazard Areas and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; or, areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot. Zone B is not subdivided.
Zone C:	Areas of minimal flooding.

Table 3, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevations for each flooding source studied in detail in the community.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Town of Allegany is for insurance purposes, the principal result of the Flood Insurance

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Allegheny River							
Reach 1	10	-4.28	-3.01	+1.09	045	A9	Varies
Fivemile Creek							
Reach 1	10	-3.90	-1.20	+2.50	040	A8	Varies
Reach 2	05,10	-2.00	-0.50	+0.10	020	A4	Varies
Reach 3	05	-0.90	-0.30	+0.40	010	A2	Varies
Reach 4	05	-1.50	-0.40	+0.40	015	A3	Varies
Fourmile Creek							
Reach 1	10	-1.2	-0.4	+0.8	010	A2	Varies
West Branch Fourmile Creek							
Reach 1	10	-1.0	-0.4	+0.7	010	A2	Varies
Twomile Creek							
Reach 1	10	-0.6	-0.3	+12.1	005	A1	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO THE NEAREST FOOT–SEE MAP

TABLE 4

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF ALLEGANY, NY
(CATTARAUGUS CO.)

FLOOD INSURANCE ZONE DATA

ALLEGHENY RIVER, FIVEMILE CREEK, FOURMILE CREEK, WEST BRANCH FOURMILE CREEK AND TWOMILE CREEK

Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FIA.

6.0 OTHER STUDIES

A Flood Plain Information Report for this reach of the Allegheny River and Fivemile Creek was prepared by the COE in August 1969 (Reference 5). The 100-year flood elevations for the Allegheny River contained in this report are substantially the same as those presented in the COE study. Minor water-surface elevation differences are attributable to the lengthened period of record and the incidence of the 1972 flood. The new elevations were prepared by the COE under subcontract, obviating the necessity of resolving the small differences. Computed water-surface elevations for Fivemile Creek are also slightly higher than those presented in the COE study. These new elevations have been concurred with the COE and are also attributable to the longer period of record utilized in this study.

Flood Insurance Studies are currently underway by the DEC for other communities within the Allegheny Basin. The Village of Allegany and City of Olean are contiguous to the Town of Allegany and are being studied at this time (References 23 and 24, respectively). Hydraulic determinations have been coordinated to insure agreement between communities.

This study is authoritative for the purposes of the Flood Insurance Program and the data presented here either supersedes or are compatible with previous determinations.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the office of the Federal Insurance Administration, Regional Director, 26 Federal Plaza, New York, New York 10007.

8.0 BIBLIOGRAPHY AND REFERENCES

1. U. S. Department of Agriculture, Soil Conservation Service, Generalized Soil Map of New York State, Cornell University Agricultural Experiment Station, 1967.

2. New York State, State Legislative Manual, 1974.

3. Allegheny River Basin Regional Water Resources Planning Board, Draft of Comprehensive Water Resources Plan for the Allegheny River Basin, May 1975.

4. U. S. Army Corps of Engineers, Post-Flood Report-Tropical Storm Agnes, Pittsburgh, October 1974.

5. U. S. Army Corps of Engineers, Flood Plain Information Report, Allegheny River and Fivemile Creek, Allegany, New York, Pittsburgh, October 1974.

6. U. S. Department of the Interior, Geological Survey, Geological Survey Water-Supply Paper, Surface Water Supply of the United States, Part 3, Ohio River Basin, 1976.

7. U. S. Department of the Interior, Geological Survey, Water Resources Division, Subdistrict Office, Rating Table No. 2, Allegheny River at Olean, New York, Ithaca, New York, August 19, 1975.

8. U. S. Army Corps of Engineers, Statistical Methods in Hydrology, Leo R. Beard, Sacramento, California, January 1972.

9. Water Resources Council, "Guidelines for Determining Flood Flow Frequencies," Bulletin No. 17, March 1976.

10. U. S. Department of Agriculture, Soil Conservation Service, National Engineering Handbook, Section 4, Hydrology, and Section 5, Hydraulics (Supplement B), periodically updated.

11. U. S. Department of Commerce, National Weather Service, Technical Paper No. 40: Rainfall Frequency Atlas of the United States, May 1961.

12. U. S. Department of Agriculture, Soil Conservation Service, Engineering Division, TR-20 Computer Program, May 1965.

13. U. S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Generalized Computer Program, Davis, California, October 1973.

14. U. S. Department of Agriculture, Soil Conservation Service, WSP-2 Water Surface Profiles, Generalized Computer Program, May 1976.

15. U. S. Department of the Interior, Geological Survey, Geological Survey Water Supply Paper 1849, Roughness Characteristics of Natural Channels, 1967.

16. U. S. Army Corps of Engineers, Unpublished Cross Section Data for Portions of the Allegheny River Basin, Pittsburgh, Pennsylvania, 1974.

17. U. S. Department of the Interior, Geological Survey, Flood Height-Drainage Area Relation for 100-Year Floods, New York Basins, December 1973 (unpublished).

18. U. S. Department of the Interior, Geological Survey, 7.5 Minute Series (Topographic) Maps, Scale 1:24,000, Contour Interval 20 feet: Knapp Creek, New York, 1961; Hinsdale, New York, 1961; Humphrey, New York, 1961.

19. New York State, Department of Transportation, 7.5 Minute Series (Planimetric) Maps, Scale 1:24,000; Knapp Creek, Hinsdale, Humphrey, New York, 1961.

20. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Town of Allegany, New York, July 26, 1974.

21. Lockwood, Kessler, Bartlett, Incorporated, Unpublished Topographic Maps, Town of Allegany, Scale 1:4,800, Contour Interval 5 feet: Syossett, New York, 1975.

22. U. S. Department of Agriculture, Soil Conservation Service, Central Technical Unit, HUD-15 Computer Program, March 1974.

23. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Village of Allegany, Cattaraugus County, New York, October 1976.

24. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, City of Olean, Cattaraugus County, New York, October 1976.

Allegheny River Basin Regional Water Resources Planning Board, Alternatives for Water Resources Development and Management, March 1971.

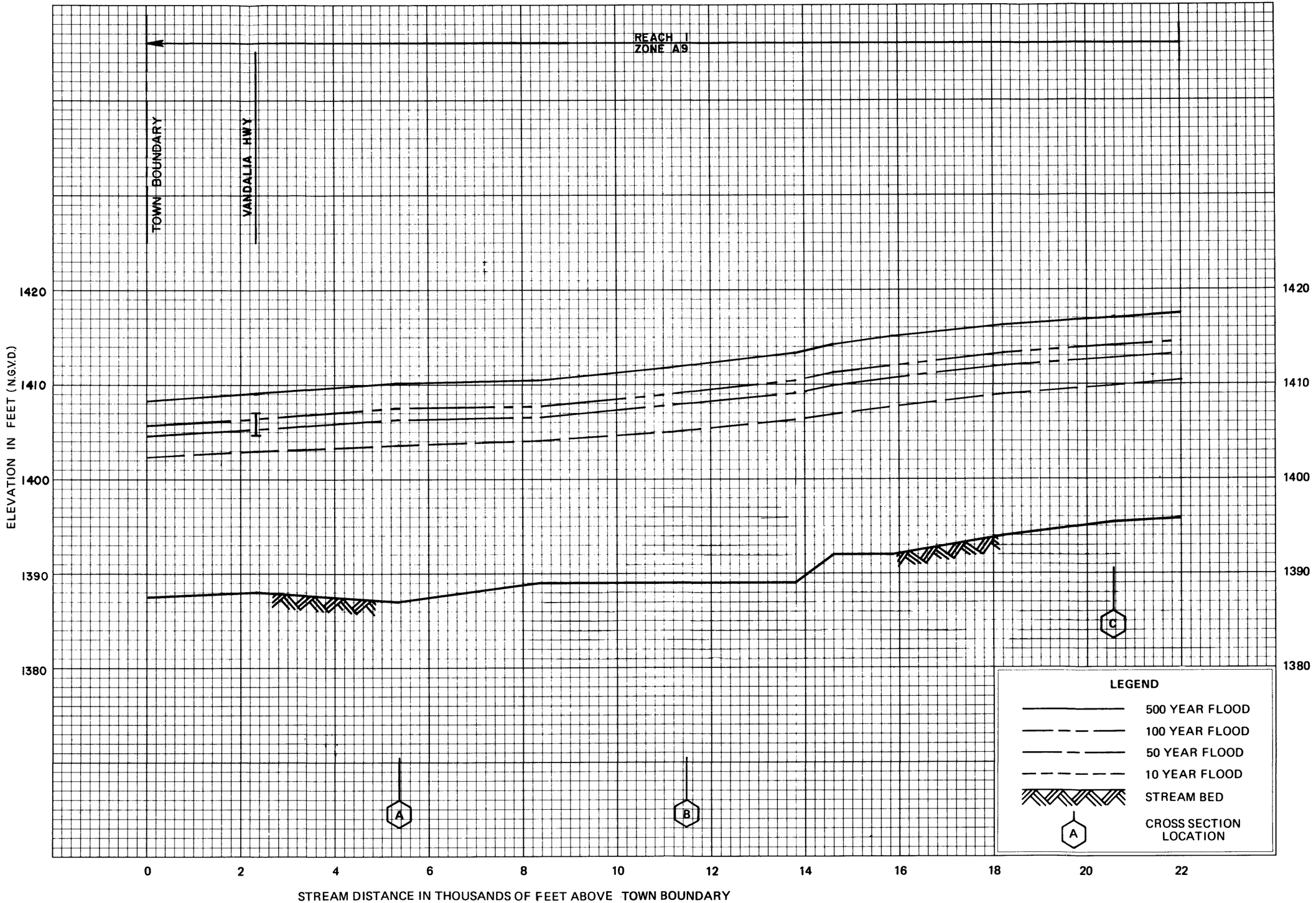
Potter, W. D., "Use of Indices in Estimating Peak Rates of Runoff," Public Roads, Volume 28, Number 1, Pages 1-8, April 1974.

U. S. Department of Agriculture, Soil Conservation Service, Technical Paper SCS-TP-149, A Method for Estimating Volume and Rate of Runoff in Small Watersheds, April 1973.

U. S. Department of the Interior, Geological Survey, Water Resources Data for New York and Pennsylvania, Part 1 - Surface Water Records, Annual Summary, 1976.

U. S. Department of the Interior, Geological Survey, Professional Paper 924, Magnitude and Frequency of Floods in the United States, 1975.

☆U.S. GOVERNMENT PRINTING OFFICE: 1990 - 261-084/00992



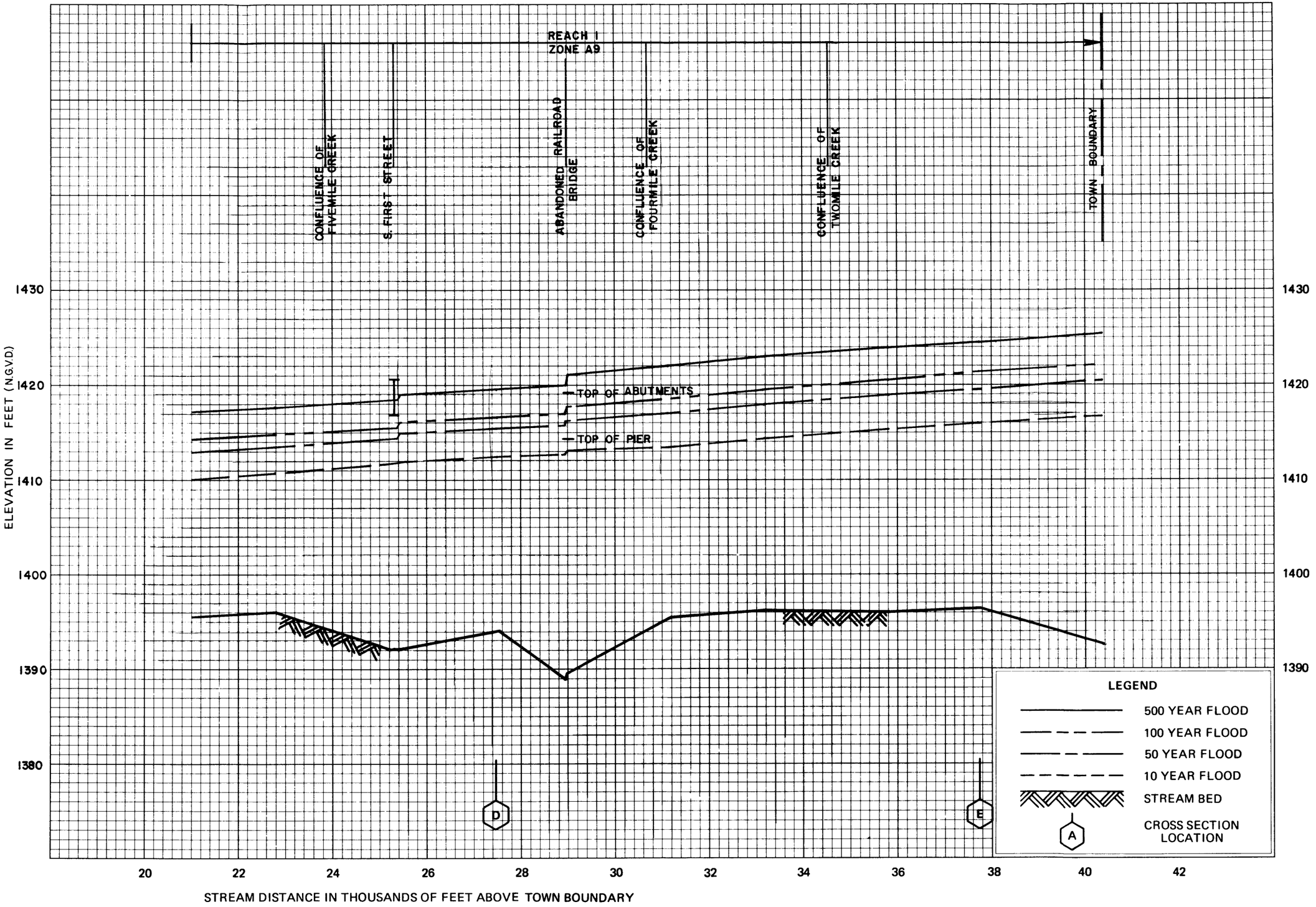
FLOOD PROFILES

ALLEGHENY RIVER

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF ALLEGANY, NY
(CATTARAUGUS CO.)

01P



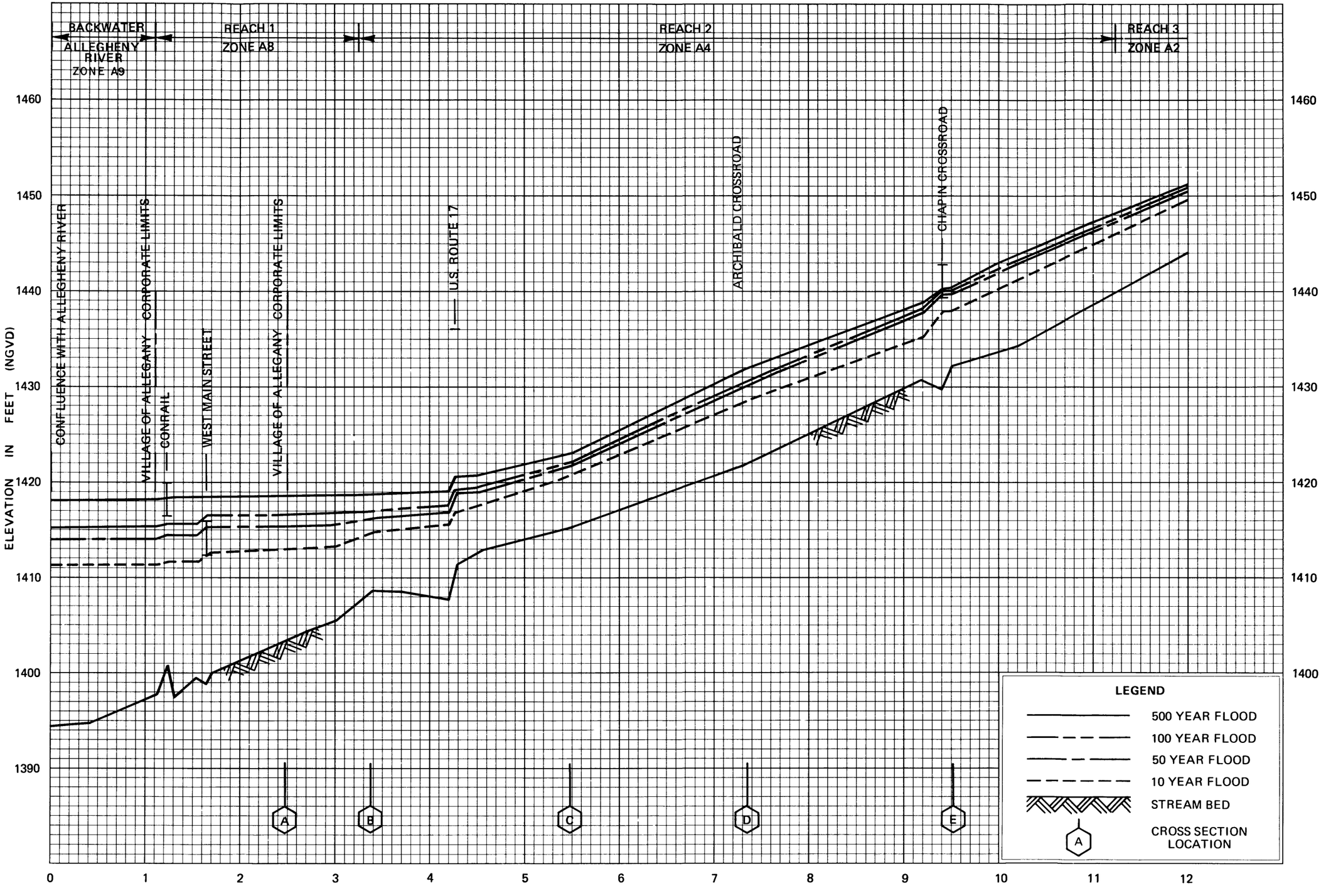
FLOOD PROFILES

ALLEGHENY RIVER

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF ALLEGANY, NY
(CATTARAUGUS CO.)

02P



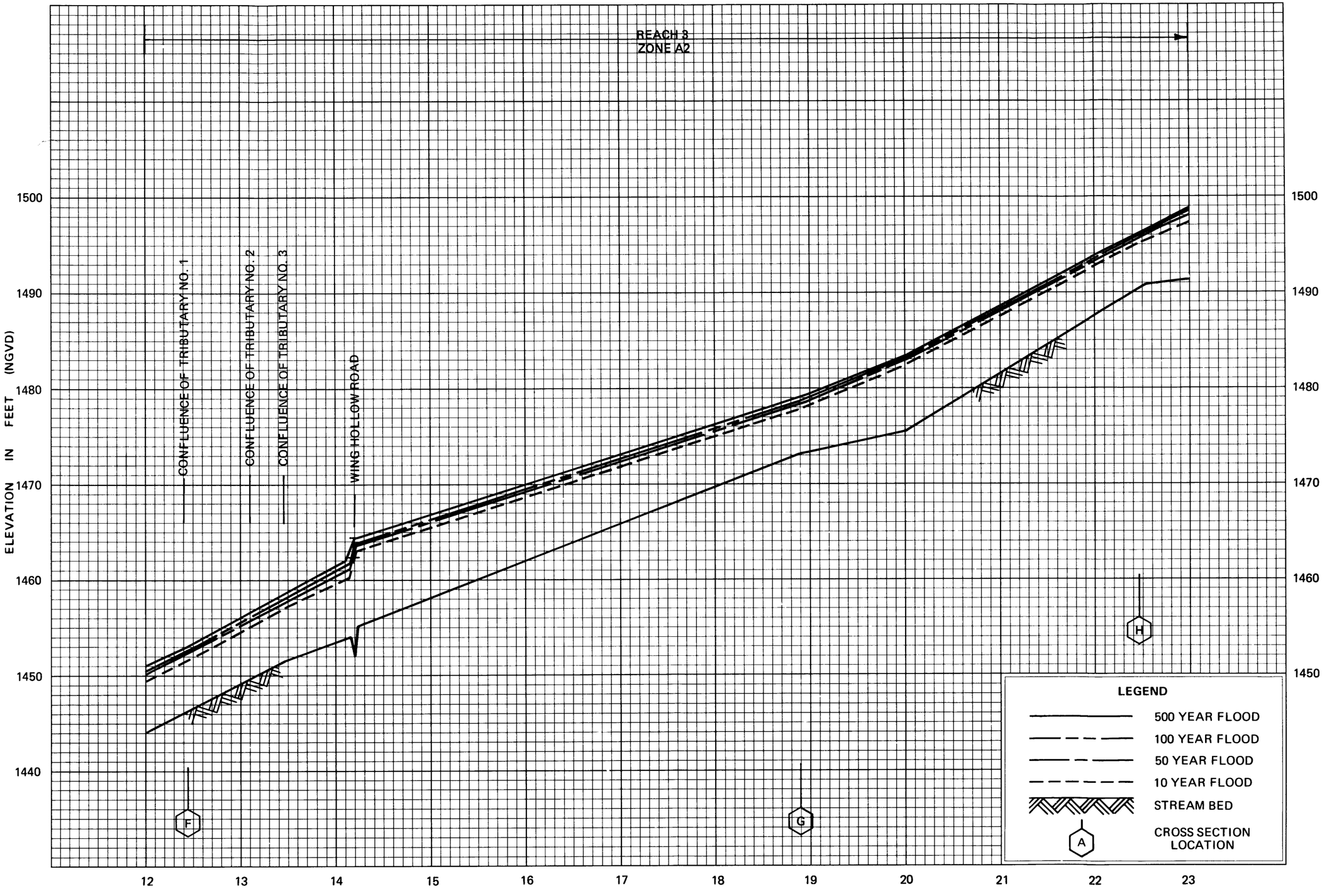
FLOOD PROFILES

FIVEMILE CREEK

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF ALLEGANY, NY
(CATTARAUGUS CO.)

03P



STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH THE ALLEGHENY RIVER

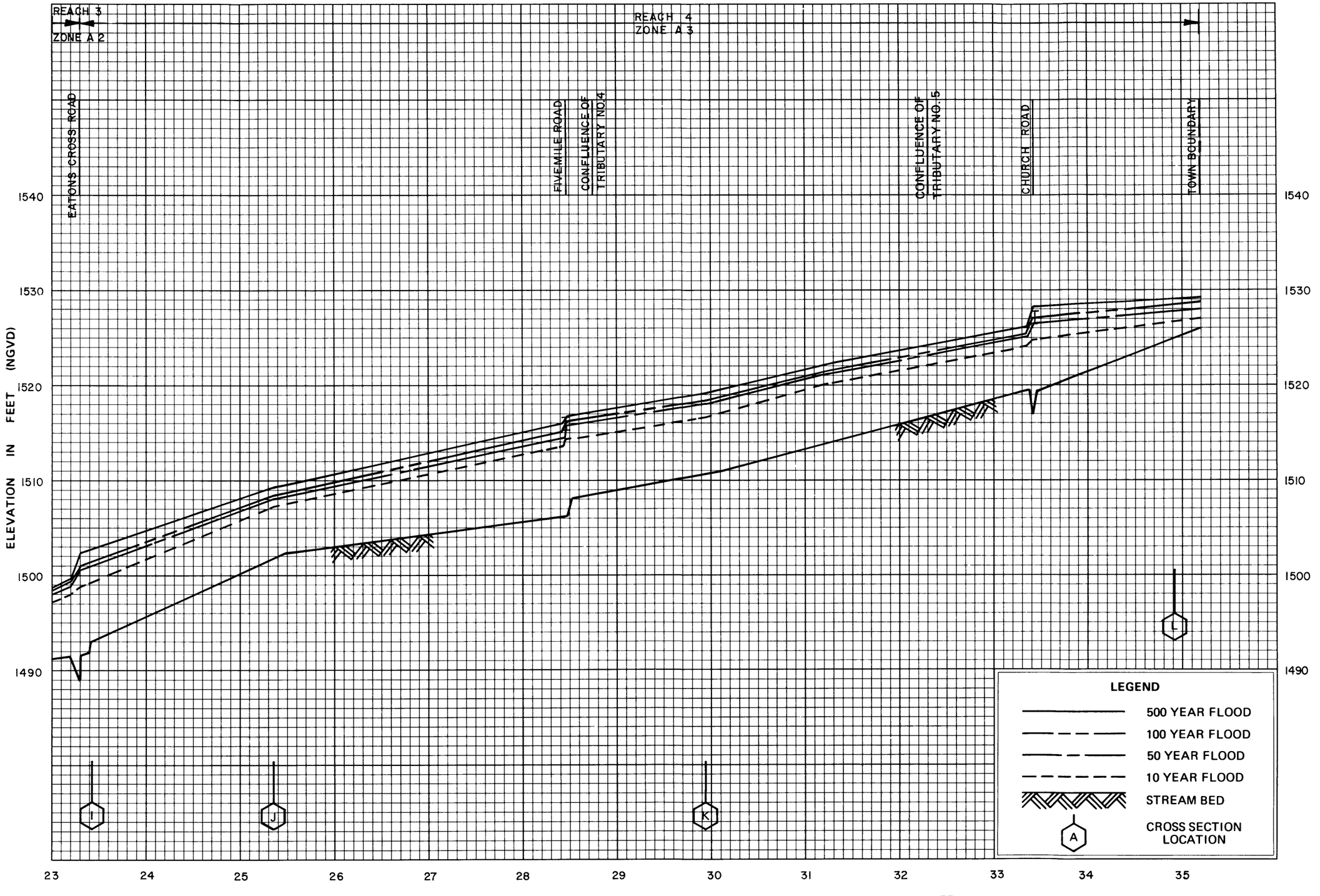
FLOOD PROFILES

FIVEMILE CREEK

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF ALLEGANY, NY
(CATTARAUGUS CO.)

04P



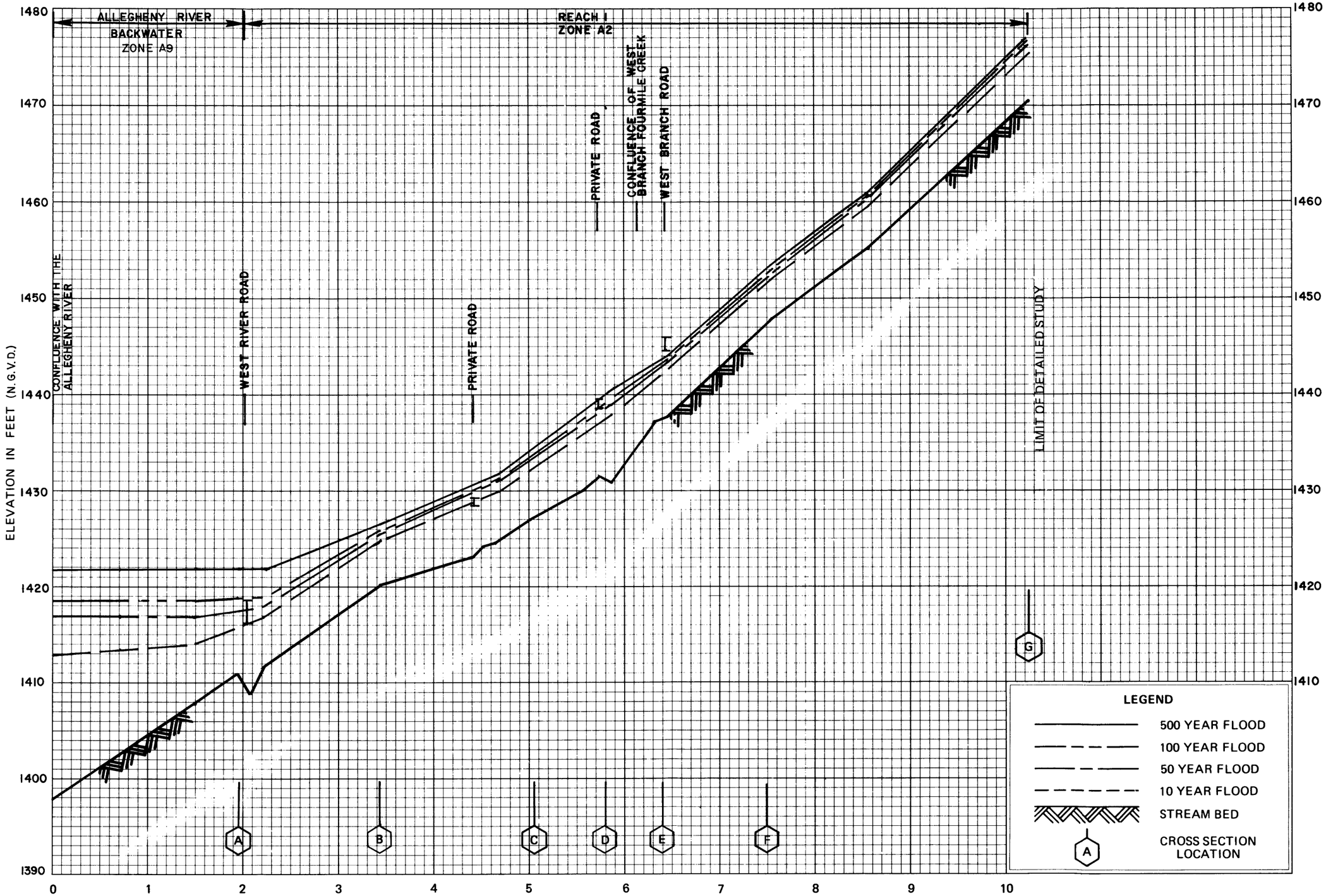
FLOOD PROFILES

FIVEMILE CREEK

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF ALLEGANY, NY
(CATTARAUGUS CO.)

05P



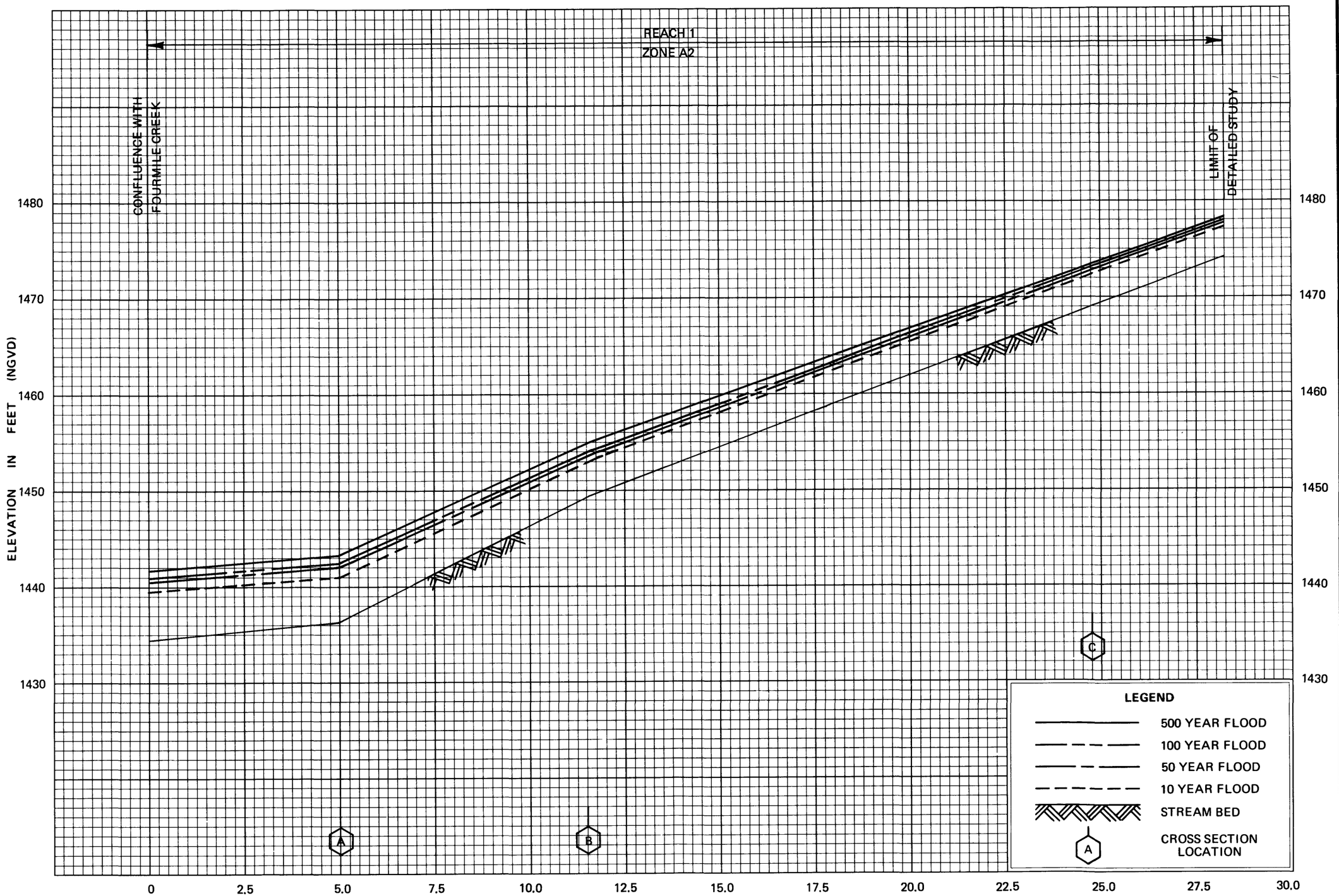
FLOOD PROFILES

FOURMILE CREEK

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF ALLEGANY, NY
(CATTARAUGUS CO.)

06P



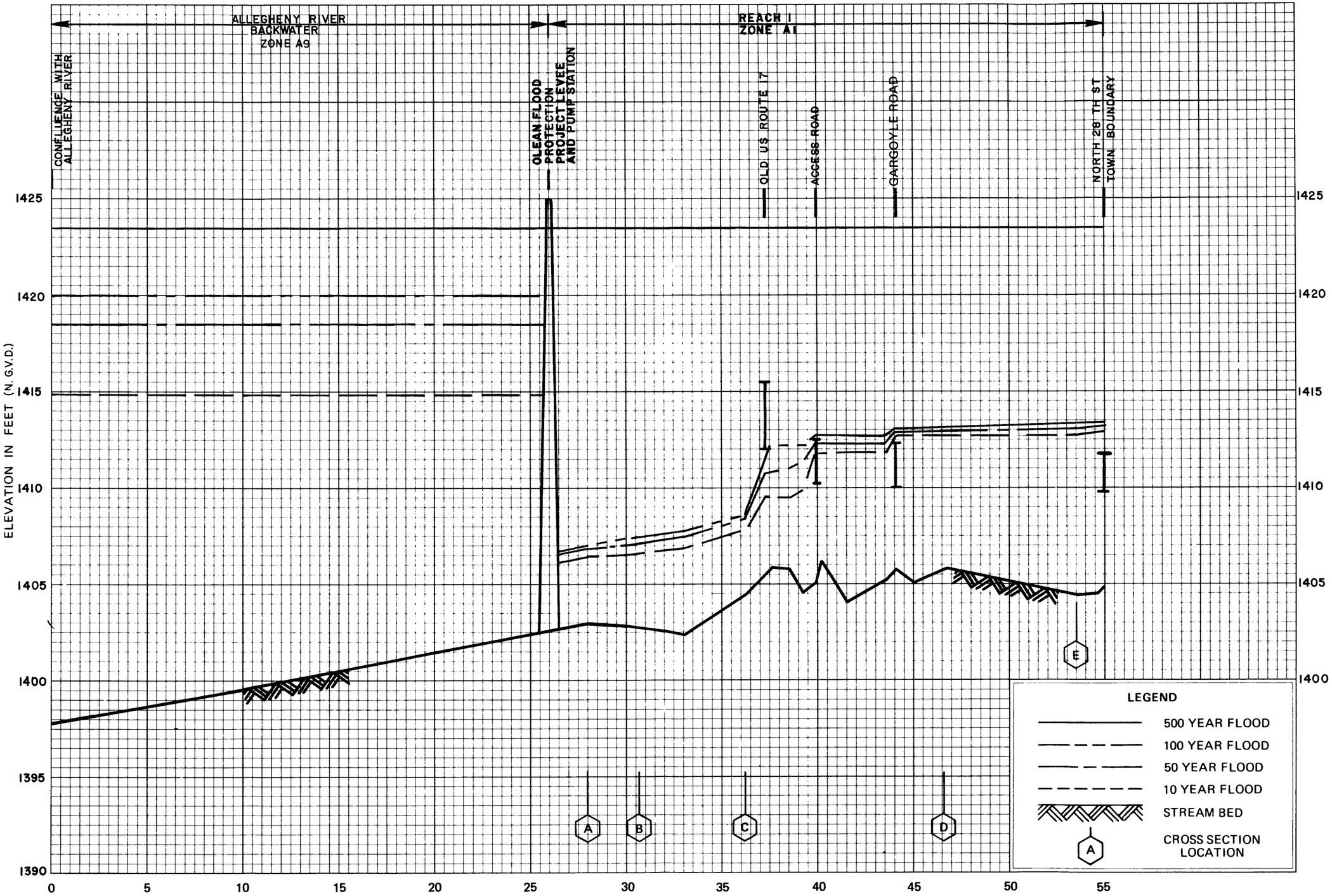
FLOOD PROFILES

WEST BRANCH FOURMILE CREEK

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF ALLEGANY, NY
(CATTARAUGUS CO.)

07P



FLOOD PROFILES

TWOMILE CREEK

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF ALLEGANY, NY
(CATTARAUGUS CO.)

08P